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Modelling the Factors Influencing Urban Households Food and Nutrition Security Status

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Abstract

There was a rapid migration from poor rural areas to swollen urban areas in search of better jobs and a better life. While some local immigrants have managed to find a better life, most immigrants cannot guarantee the improvement of the quality of life as they hoped. It has become a nightmare of economic and food insecurity. A pilot study was conducted to determine food safety and famine and to assess factors affecting food safety for families in Aquibum, Nigeria. We used a survey to obtain information from 240 households. The Food Safety Index is used to analyze the state of food safety in the home. Foster, Greer, and Thorbecke (FGT) weighted poverty indices were adopted to analyze the incidence and severity of the Torbit Hunger Regression Model. It is used to analyze household food safety determinants. Analysis results show that hunger is lower in families of skilled workers than in mining operations. The results also showed that families suffer from hunger and unstable food. The results showed that the incidence of food insecurity and hunger was 0.52 and 0.61, respectively, which increase with age and family size. Policies aimed at improving living standards in rural areas are wise policy decisions to prevent conquest of the village, including age, education level, profession, household head income level, family size, and food safety. It is the most important determinant people to urban areas.

Introduction

FAO (2003) defines food security as a situation that exists when all people at all times, have physical, social and economic access to sufficient, safe and nutrition food that meets their dietary needs and healthy life. But the ability of households to access sufficient good is hampered by many factors. One of such factors impeding the capacity of many families to meet their food and nutrition requirements is the rapid rate of urban growth or urbanization. Although rapid urbanization is often seen as a problem to many development professionals and stakeholders, Satterthwaite et al., (2010) posited that no nation has prospered without urbanization and there is no prosperous nation that is not predominantly urban.

The phenomena of urbanization and rapid urbanization across the world are not entirely new and has been a subject of increased discourse and scholarly inquiry (Szabo, 2015). The nexus between population and food are well established and have benefited from in-depth scholarly investigation (Bongaarts, 2011; McNicoll, 1984; Pimentel et al, 1994; Pimentel et al 1997). The rising rate of urbanization, low employment opportunities and poor economic infrastructure in the sub-Saharan Africa (Nigeria inclusive) have continued to put undue

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pressure on the limited available resources (including land for agricultural production and foods) in the urban areas (Adeyemo et al, 2013; Iorlamen et al, 2013; Nwose, 2013).

Although urbanization brings a positive development as urban areas tend to be more productive than rural areas and therefore a driver of economic growth and development (Overman & Venables, 2005), rapid urban growth in many developing countries has outstretched the capacities of most cities to absorb to manage the increasing population. According to Matuschke (2009)this low absorptive capacity of the cities leads to the development of slums and poses considerable threat to all dimensions of food security since majority of urban residents are net food buyers who spend a large part of their disposable income on food. Due to lack of infrastructure by cities to absorb an ever increasing number of people (Cohen, 2006; Montgomery, 2008), developmaent of slums which manifest as low income, overcrowded settlement with poor human living conditions are usually experienced by inhabitants (UN-HABITAT, 2003). The increased urbanization of global population seldom causes a rise in persons living in poverty in most cities. Uncontrolled urbanization and low absorptive capacity by cities also tend to increase the level of poverty (Chen and Ravallion, 2007; Etim, 2015). Studies by Satterthwaite, (2003); Ruel & Garrett (2003); Montgomery (2004); 2008; Matuschke, (2009); Ruel et al (2010); FAO, (2011) reveal the negative impact of urban growth on water and food security.

Nigeria is one of the most populated countries not only in African continent but globally as it ranks 7th in the list of countries by population. According to (United Nations, 2019), the country has a population of206,139,589 million with annual growth rate of 2.5 percent and 50.2 percent of the population is urban. A recent report by World Bank (2012) revealed that urban population in Nigeria increases at approximately 4% per annum whereas rural population grows at approximately 1%. As urbanization increases, the problem of food security becomes more prominent and should no longer be treated with levity. The reason being that, the occurrence of food insecurity and poverty are two intractable problems associated with rapid urbanization (Omonona et al 2007; Aiken 2013). But the empirical understanding of factors affecting the food security status of households is a pointer to rational food policy decisions. Information on urban households food security status in Niger Delta region is limited. To fill this lacuna, a study was therefore conducted to estimate the factors influencing urban food security status of households in the study area.

Methods

The study was carried out in Akwa Ibom State, one of the states that make up the Niger Delta Region of Nigeria. The state lies between latitude 4˚33' and 5˚53' North and longitude 7˚25' and 8˚25' East. According to National Population commission (NPC 2006), there are 3.9 million people in the state. The state is located in the rainforest belt and is characterized by heavy rains with annual precipitation ranging between 2000mm – 3000mm. For administrative and political convenience, the state is divided into 31 local government areas and 3 senatorial districts. For the purpose of agricultural zoning, the state has 6 Agricultural Development Project (ADP) zones namely Uyo, Eket, Abak, Oron, Ikot Ekpene, Etinan and it has 2 distinct seasons viz:- short dry season and long rainy season. The major occupation of most urban dwellers is civil service although they are engaged in part-time farming activities. The rural households are mainly farmers and traders. Primary data were used for this study. Data were collected from households using well structured questionnaires. Primary data included data on household income and expenditure, socio economic characteristics of household and their heads. Multistage sampling procedure was employed for the study. First, 3 senatorial districts were purposively selected. Secondly, 4local government areas were randomly selected per senatorial district to make a total

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of 12 local government areas. Thirdly, 20 households were randomly selected to make a total of 240 households.

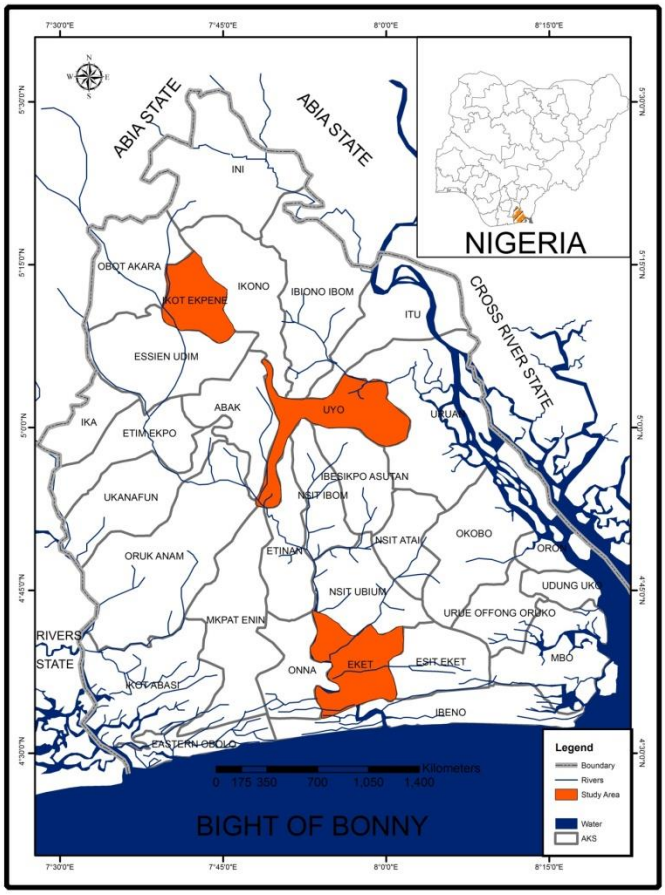

Figure 1: Map of Akwa Ibom State, Nigeria showing Location of Study

Model Specification

Foster, Greer & Thorbecke (1984) weighted poverty index was adapted for the quantitative hunger assessment. The choice of this measure is due to its decomposability feature. The FGT measure for the sub-group (P∝i)is given as:

$$P\alpha i = n^{-} \sum_{j=1}^{qi} \left[\frac{z - Yji}{z,\ 0\ max}\right]^{\propto}$$

Where Pαi is the weighted poverty index for the ith subgroup; n_i is the total number of households in the ith subgroup households in poverty; Yji is the per adult equivalent expenditure of household j in sub-group i; z is the poverty line and αis the degree of concern for the depth of poverty.

For equation1, when ∝ is equal to zero, it implies no concern and equation 1 gives the head count ratio for the incidence of hunger (the proportion of the households that is hungry). That is

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$$P\propto i = ni-1 \quad [(Z-Yy)/Z, 0max)]= \frac{qi}{ni})^0$$

$$\sum_{j=1}^{qi}$$

When ∝ is equal to 1, it shows uniform concern and equation becomes

$$P_1 i = ni-1 \quad \sum_{j=1}^{qi} \quad [(Z-Yy)/Z, 0max)] = \frac{qi}{ni})^1$$

The equation (3) above measures the depth of hunger. It is otherwise called the hunger gap.

When ∝ is equal to 2, distinction is made between the hunger and the most hungry. Equation become

$$P2i = ni-1 \quad \sum_{j=1}^{qi} \quad [(Z-Yy)/Z, 0max)] = \frac{qi}{ni})^2$$

Equation gives a distribution sensitive FGT index called the severity of hunger. It tells us the extent of the distribution of expenditure among the poor.

$$P\alpha i = n^{-I} \quad \sum_{j=1}^{qi} \quad \left[\frac{z - Yji}{z,\ 0\ max}\right]^{\propto}$$

Where P∝ is the weighted poverty index for the whole group, m is the number of subgroups while n and ni are the total number of households in the whole group and the ith sub-group respectively.

The contribution (Ci) of each sub-group's weighted poverty measure to the whole group's weighted poverty measure was determined using

$$Ci = niP\propto i/nP\propto$$

Since the FGT measures were estimated on the basis of sample observation, we tested whether the observed differences in their values are statistically significant or not.

The test of significance of P∝i (subgroup poverty measure) relative to the P∝ (whole group poverty measure) is given according to Kakwani (1993) by

$$t = (P\propto i - P\propto)/SE(P\propto i) \quad (7)$$

where standard error of P∝i, denoted by SE (P∝i) is $\sigma(P\propto i)\sqrt{ni}$ for large samples (ni≥ 30)

The Tobit regression, a hybrid of the discrete and continuous dependent variable was used to determine the impact of the explanatory variables on the probability of being food insecure. The model is expressed based on Tobin (1958).

$$q_i = Pi = X_i\beta + e_i \text{ if } P_i > P_i^*$$

$$= O = X_i\beta + e_i \text{ if } P_i \leq P_i^*$$

$$i = 1, 2, \ldots\ldots\ldots\ldots..,240$$

where qi is the dependent variable. It is discrete when the households are food secure and continuous when they are food insecure. Pi is the food insecurity depth/intensity defined as (Z

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– Yi)/Z and Pi* is the food insecurity depth. Xi is a vector of explanatory variable, β is a vector of unknown coefficient and ei is an independently distributed error term.

The explanatory variables specified as determinants of the food security were:

X_1 = Sex of the household (D=1 if male 0 if otherwise)
X_2 = Age of the household head in years
X_3 = Marital status of the household
X_4 = Location of Residence (D = 1 of urban, 0 if rural)
X_5 = Household Type (1 if cement/roof building, 0 if mud/thatched building)
X_6 = Household size (number of household members)
X_7 = Education (years of schooling)
X_8 = Remittance Access (D = 1 if yes, 0 if otherwise)
X_9 = Household income in Naira
X_{10} = Access to credit (D = 1 if yes, 0 if otherwise)
X_{11} = Distance to market (D = 1 if yes, 0 if otherwise)

Results and Discussion

Hunger Profile of Household

Hunger was decomposed among households according to socio-economic characteristics to see how hunger varies between sub-groups.

Age of the Household Head

Three age categories were used to profile hunger among households namely 21-40 years, 41-60years and 61-80 years. The incidence of hunger among household increased with the age of household head. Result is synonymous with earlier empirical findings by Dercon and Krishnan (1998) and Etim (2015) that poverty and hunger incidences are lower in households headed by persons aged below 45 years. A similar study by FOS (1999) also found that older household heads have more poverty than younger ones. The contribution to the whole group hunger incidence is 14, 75 and 11 by households whose heads age are 21-40 years, 41-60 and 61-80 years respectively.

Table 1: Comparison of hunger by age of household heads

Age of household head (years)	P_0	P_1	P_2	Contribution to		
				P_0	P_1	P_2
21-40	0.28 (-2.30)**	0.30 (1.35)	0.31 (0.83)	0.14	0.15	0.13
41-60	0.50 (0.33)	0.49 (0.81)	0.46 (1.20)	0.75	0.71	0.70
61-80	0.60 (2.20)**	0.52 (3.11)***	0.88 (1.80)*	0.11	0.14	0.17
All	0.61	0.43	0.40	1.00	1.00	1.00

Figures in parentheses are t-values of Pα ***Significant at 1%, ** at 5%, * at 10%.

Result on table 2 reveal that the incidence of hunger is highest (68 percent) among farm households without education and lowest (28 percent) among household heads with tertiary educational attainment. Similar empirical findings were obtained by Schubert (1994), FOS (1999) and Etim (2007) that people with low level of human capital tend to have higher incidence of poverty. The incidence of hunger is 51 and 40 percent among household heads with primary and secondary education respectively.

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Table 2: Comparison of Poverty by Educational Status of the Household Head

Educational status of household head	**P_0**	**P_1**	**P_2**	**Contribution to**		
				P_0	**P_1**	**P_2**
No formal	0.58	0.59	0.66	0.50	0.55	0.52
Education	(1.71)*	(2.0)**	(2.15)**			
Primary	0.51	0.40	0.39	0.25	0.25	0.22
Education	(1.33)	(-0.07)	(-0.09)			
Secondary	0.40	0.32	0.30	0.13	0.03	0.04
Education	(-0.57)	(1.00)	(-0.62)			
Tertiary	0.28	0.27	0.24	0.12	0.12	0.12
Education	(-2.78)***	(-3.00)***	(-2.07)**			
All	0.61	0.43	0.40	1.00	1.00	100

Figures in parentheses are t-values of Pα ***Significant at 1%, ** at 5%, * at 10%.

Households were decomposed into 3 sub-groups namely 1-5 members, 6-10 members and 11-15 members. Result on table 3 showed that all the three sub-groups hunger incidence were statistically significant ($p<0.05$) implying that hunger incidence in the 3 sub-groups are different from that of the whole group. Finding show that is the size of household increases, the extent of hunger and poverty also increases. The reason may be attributable to the fact that increased household size implymore dependants who rarely contribute to household income. Finding are synonymous with earlier results by World Bank (1991), Lanjouw and Ravallion(1994); Schubert (1994); World (1996).

Table 3: Comparison of Hunger by Household Size

Household size	**P_0**	**P_1**	**P_2**	**Contribution to**		
				P_0	**P_1**	**P_2**
1-5	0.31 (-2.05)**	0.12 (0.58)	0.08 (3.11)***	0.16	0.11	0.18
6-10	0.62 (2.31)**	0.31 (1.43)	0.39 (1.33)	0.30	0.40	0.40
11-15	0.76 (3.08)***	0.48 (1.28)	0.50 (2.11)**	0.54	0.49	0.42
All	0.61	0.43	0.40	1.00	1.00	1.00

Figure in parentheses are t-values of p ∝*** significant at 1% ** at 5%.

Table 4 shows the comparison of hunger by occupational. Three occupation categories were used to profile hunger among households. However, the incidence of hunger among households was highest (51 percent) among households engaged in farming and lowest in households who were employed by government. The severity and depth of hunger were also lowest in households that were government employed. This may not be unconnected with the fact that most persons employed by the government were educated which have helped to propel them from poverty and hunger.

Table 4: Comparison of Hunger by Occupation of Household Head

Occupation	**P_0**	**P_1**	**P_2**	**Contribution to**		
				P_0	**P_1**	**P_2**
Farming	0.51 (1.77)*	0.42 (0.51)	0.50 (1.32)	0.48	0.33	0.51

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Artisans	0.49 (2.01)**	0.42 (0.18)	0.40 (1.03)	0.42	0.40	0.40
Government Employed	0.20 (3.26)***	0.23 (1.93)*	0.19 (2.25)*	0.10	0.25	0.09
All	0.61	0.43	0.40	1.00	1.00	1.00

Figure in parenthesis are t-values of p∝ *** significant at 1% ** at 5%

Table 5: Maximum Likelihood Estimates of the Determinants of Food Security

Variable	**Co-efficient**	**Standard Error**	**Z-value**
Sex of household Head (X_1)	0.2111	0.2144	0.985
Age of household head (X_2)	0.0812	0.6520	0.125
Marital status of household head (X_3)	0.5240	0.3582	1.463
Location of Residence (X_4)	-0.1284	0.0395	-3.251***
Household size (X_5)	0.0401	0.5200	0.077
Household type (X_6)	0.2558	0.0880	2.907***
Education (years) (X_7)	-0.2790	0.1224	-2.279*
Remittance Access (X_9)	0.3210	0.6532	1.043
Household income (X_{10})	0.2310	0.1524	2.172**
Access to credit (X_{11})	0.2100	0.0997	2.106**
Distance to market (X_{12})	0.0667	0.0182	3.665***
Constant	0.4400	0.2192	2.007**
Sigma σ	0.7211	0.3587	2.010**

***,** and * denote significance at 1%, 5% and 10% respectively.

The coefficient of education is -0.2790. This implies that the food insecurity is decreased by 0.2790 for individuals in families whose heads have formal education to become 0.161. Household heads without formal education have food insecurity depth of 0.4400. This may be attributed to the fact that highly educated household heads have the tendency to adopt and are receptive to new agricultural techniques better than the less educated ones. Educated households have better access to price and nutrition information through media and other services which the less educated households cannot access. This however impacts their accessibility and utilization of food positively. Finding is consistent with earlier empirical result by Feder et al 1985, Udoh and Etim 2006; Etim and Okon (2013); Etim and Edet (2013); Etim (2015); Etim et al (2017) who variously found that higher education empowers people to interpret and respond to information and ideas much faster than their counterpart with lower education.

Household access to credit has a coefficient of 0.8100 and is positively signed as expected. This is an indication that families with social inclusion (that is those with access to credit facilities) have a higher probability of accessing and utilizing diverse foods due to the augmenting effect of credit on household income. Bernell et al (2005) in his earlier empirical finding reported that the significance and positivity of the sign is an indication that social support has a strong influence on food security through better access to food or production resources.

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The coefficient of distance to the nearest market is 0.0667 and is statistically significant ($p<0.01$). Distance from the household to the nearest market or trading centre proxies market products and information access. The farer the distance to the market, the less frequently households visit the market and the less likely they will access market information and the products (Staal et al 2002; Feleke et al 2005; Matchaya and Chilonda 2012) and food security will be adversely affected and vice versa.

The location of residence has a coefficient 0.6284 and is statistically and negatively significant ($p<0.01$).The more urbanized the location of residence is the higher the probability of being food insecure. This is not unconnected with the fact that the pace of economic and urban change tends to outstrip the pace of needed social and political reforms.

The coefficient of income accruable to household is positively signed, has a coefficient -0.2310 and statistically significant at 5% level. This indicates that for every naira increase in farm income, the level of food insecurity will be reduced by 0.2310. This is true since an increase in income raises households ability to consume and invest in various economic ventures in order to generate additional income for the household. Result implies that income is important in securing food for households. Incomes further indirectly proxy the impact of household level market access on food security which signals that some commodities consumed by the household are purchased from the market. Similar empirical findings were reported by Matchaya & Chilonda (2012) in Malawi.

Household size has coefficient 0.2558 implying that a unit increase in household size will raise the food insecurity by 0.2558. This is obvious since most dependents household members particularly children contribute less to family labour and income.

Conclusion

The recent drift of rural dwellers to cities have resulted in overcrowded settlements resulting in poor living conditions and hunger. This study empirically analyzed how urban affected the food security of households and the factors influencing the food security status of households. The most critical factors affecting food security status of households were household size, education, household income, credit accessibility and distance to market. Urbanization has been found to decrease food security by bringing pressure on food demand. Policies of government should be geared at ensuring that cultivable lands are put to efficient use to promote sustainable food production that will keep pace with urban growth.

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